MODELLING THE HEALTH SECTOR: NIGERIA

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ABSTRACT

Good health is a crucial part of well being but spending on health can be justified on economic grounds. The goal of reducing poverty provides a different but equally powerful case for health investments. However, if policy makers are to accelerate the substantial health gains of recent decades, especially for the poor in African countries such as Nigeria, the agenda for reform is clear. Therefore, the thrust of this project is to formulate a model – based viable health policy reforms framework that will guarantee the attainment of the United Nations Millennium Development goals (as well as the capacity to live longer, healthier and more productive lives).

Key words **HEALTH, AIDS, MALARIA, SARS, MORTALITY, MATERNAL HEALTH, PUBLIC HEALTH, DNA, CLINICAL SERVICES, POVERTY, MODELLING, DEVELOPMENT, NIGERIA, MDGS, POLICY**

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1.0 ***INTRODUCTION***

" A HEALTHY NATION IS A WEALTHY NATION"

-POPULAR SAYING-

" AIDS *threatens to reverse a century of development progress in the fight against infections diseases and poverty"*

-WORLD BANK 1997 -

" Elevated lead levels in children have been associated with impaired neuropsychologic development as measured by loss of intelligent Quotient (IQ), poor school performance and behavioural difficulties"

- WDR, 1993 -

The Arabian proverb, "He who has health has hope, and he who has hope has everything", underscores the importance of public health as a resource in the process of economic development. Every one wants to be healthy. But good health can be elusive as can be seen by the numbers of people who have health complaints.

Indeed, good health is a crucial part of well being but spending on health can be justified on economic grounds. Improved health contributes to economic growth in several ways. It reduces production; losses caused by worker illness; it permits the use of natural resources that had been totally or nearly in accessible because of disease; it increases the enrollment of children in school and makes then better able to learn: and it frees for alternative use of resources that would otherwise have to be spent on treating illness. The economic gains are relatively greater for poor people, who are typically most handicapped by ill health and who stand to gain the most from the development of underutilized natural resources.

The most obvious sources of gain are fewer work days lost to illness, increased productivity, greater opportunities to obtain better – paying jobs, and longer working lives. Healthier workers earn more because they are more productive and can get better paying jobs. When illness strikes, an individual's lost output and earnings often go undetected in economic statistics because they are borne by the household. Again, the benefits of improved health are likely to influence the way work is organized and carried out. With a

healthy work force, employers can reduce the costs of building slack into their production schedules, invest more in staff training, and exploit the benefits of specialization.

The goal of reducing poverty provides a different but equally powerful case for health investments. The adverse effects of ill health are greatest for poor people, mainly because they are ill more often, but partly because their income depends exclusively on physical labor and they have no savings to cushion the blow. They may therefore find it impossible to recover from an illness with their human and financial capital intact*** (world) bank, 1993). In deed, the health consequences of poverty are severe, since the poor die younger and suffer more from disability. The poor are exposed to greater risks from unhealthy and dangerous conditions, both at home and at work. The poor are exposed to greater risks from unhealthy and dangerous conditions, both at home and at work. Malnourishment and the legacy of past illness mean that they are more likely to fall ill and slower to recover, especially as they have little access to health care. When a family's breadwinner becomes ill, other members of the household may at first cope by working harder themselves and by reducing consumption. Both adjustment can harm the health of the while family. If free health care is not available, the costs of treatment may drive a household deeper into debt.

Thus, spending on health is a productive investment: it can raise incomes, particularly among the poor, and it reduces the toll of human suffering from ill health. However, good health is a fundamental goal of development as well as a means of accelerating it. Targeting health as part of development efforts is an effective way to improve welfare in low – income countries such as Nigeria.

Any discussion of health policy must start with a sense of the scale of health problems. These problems are often assessed in terms of mortality, but that indicator fails to account for the losses that occur this side of death because of handicap, pain, or other disability. World Health Organization (1992) measures the global burden of disease (GBD) by combining losers from premature death, which is defined as the difference between actual age at death and life expectancy at that age in a low-mortalility population and loss of healthy life resulting from disability. The GBD is measured in writs of disability – adjusted life years (DALYS). Even as broad a measure as the GBD does not capture all the consequences of disease or injury. It excludes the social costs of disfigurement, such as that arising from river blindness or leprosy, and of ***** function

i.e. marital breakups resulting from obstetric fistula (permanent damage to the reproductive tract incurred during delivery); and violence against women, much of which goes undetected (but not unsuffered).

Over the next few decades, new health challenges will definitely emerge. These involve the significant increase in noncommunicable diseases arising from the continuing demographic transition; the spread of HIV and the increase in AIDS deaths; the increasing number of drug – resistant disease strains; and the continued use of health – damaging substances such as tobacco. Other challenges include the emergence of new microbes as devastation as HIV and the advertent spread of biological agents developed for use in war.

Specifically, in Nigeria, available data has shown that the availability and accessibility to quality health care services is poor (UNDAF, 2002). For example, in 1990, the country had a total of 13,958 health establishments, with 69 percent of them being dispensaries that are usually staffed by non – professional health auxiliaries and are able to offer a limited scope of health services maternity centres / Primary Health Centre (PHC) clinics constituted 23 percent of these while secondary and tertiary health care facilities constituted 6 and 2 percent respectively. This scenario suggests that the overall health outlook of Nigeria is poor. In fact, Nigeria remains one of the worst countries in the world, with an estimated maternal mortality ratio of 1,000 per 100,000 live births; infant mortality rates have increased from 87 per 1,000 live births in 1990 to 105 in 1999; less than 5 mortality rose from 115 to 178 per 1,000 births within the same period.

Increasing rates of drug abuse and HIV / AIDS further compound the life and development prospects of young people in Nigeria. Health services in the country are generally not adolescent – friendly and few health staff has skills to provide quality counseling and clinical RH services. The HIV sero – prevalence rate among Nigerians has been reported to increase from 1.8 percent in 1991, to 4.5 percent in 1995 and 5.4 percent in 1999. The prevalence rate among pregnant youths is approximately 6.3 percent. The rate in high – risk groups such as commercial sex workers, interstate truck drivers and tuberculosis patients is higher still. The denial and social stigma of AIDS, lack of care and support, and lack of access to anti – retroviral drugs are problems that still confront Nigerians living with HIV / AIDS today. While life expectancy in Nigeria has increased

slightly in the last decade, the living conditions and the overall quality of life of most Nigerians is considerably worse now than few years ago.

Objectively therefore, this paper intends to study the allocation of resources to the delivery of health services in Nigeria. Here, we shall commensurate on the econometric estimation of certain important relationships. Among the most important of these relationships are demand functions for health services and cost curves for hospitals. A related objective is to provide a methodological prototype as well as detailed estimates of structural parameters of a complete model of the health – case system for Nigeria.

The rest of the paper is organized into sections. Section two looks at the health sector in Nigeria. Section three examines the maternal health /child mortality status. The problems of HIV / AIDS, in Nigeria is the theme of section four malaria / Tuberculosis / SARS are fully discussed in section five. Again, methodological framework is presented in section six while section seven discusses the expected results and impact.

The following research questions shall all be addressed. How will the spread of the AIDS virus and the accompanying rise in adult mortality affect a country's economic performance? Will spending on AIDS absorb a large and growing portion of national saving thereby impeding capital formation and economic growth? These and related questions are of particular importance to decision makers in countries where domestic human and non – human resources are acutely scarce.

2.0 NIGERIAN HEALTH SECTOR

Nigeria lies on the west coast of Africa an occupies approximately 923,768 sq kilometers of land bordering Niger, Chad, Cameroon, and Benin. The country is made up of 36 states, Abuja, and 774 local government areas. The population of Nigeria was 88.99 million in 1991 while the projection for 2000 was 115.2 million (United Nations, 2001). With an annual growth rate of approximately 2.8 percent, Nigerian's population is expected to double in less than 25 years. The high growth rate is a product of persistent high fertility rate and decreasing mortality. Factors associated with the high fertility rate

include easily age of marriage, low literacy rate especially among females, and pro – natalistic socio – cultural orientations.

The Nigerian economy (Despite its wide range of resources) has not experienced the necessary managerial, institutional and structural changes that would guarantee rapid and sustainable growth conducive to as acceptable minimum standard of living. The productive and technology bases, which form the prime movers***** of the real economy are weak, obsolete, disperse, and the sectoral linkages are scarce. Poor and inconsistent macroeconomic policies, weak diversification of the economic base, gross macro – economic mismanagement, weak inter – sectoral linkages, persistence of structural bottlenecks on the economy, high import dependence and heavy reliance on crude oil exports are high on the list of causes. Other include long absence of democracy and the usurpation of political power by the military elite, lack of transparency and high level of corruption, declining productivity and low morale in the public service as well as implementation ******. Consequently, the Nigerian economy has remained under – developed and the quality of life of the average citizen has coarsened progressively with growing numbers of citizens below the critical poverty level.

While life expectancy in Nigeria had increased slowly over the years to reach a level of 53 years in 1991, the life expectancy for 1999 was 48.2 years for males and 46.8 percent for males. The disability adjusted life expectancy for the country was 38.3 for females and 38.1 years for males in 1999 (United Nations, 2001). Again, increase in infant mortality from 91 deaths per 1,000 live births in 1990 to 105 deaths per 1,000 live births in 1999 for infant mortality, and an under – five mortality rate of 157 deaths per 1,000 for 1990 and 178 deaths per 1000 for 1999 are best estimates. Reproductive health situation in Nigeria is very poor. Contraceptive prevalence rate for modern family planning was only 8.6 percent in 1999 and only 37 percent of deliveries took place in health facilities in 1999,. The country's maternal mortality ratio is one of the highest in the world and the incidence of sexually transmitted infections is believed to be high in Nigeria although data are unavailable. Adolescent reproductive health status is poor with early sexual initiation, high level of unsafe sexual practices, low utilization rate of modern family planning methods, and lack of access to quality services. Many girls are being given out order the age of 18 years against their consent and a number of other harmful practices against

women are prevalent in Nigeria. These include female genital cutting, spouse battering and widow hood rites.

Unfortunately, the funding for health sector has been very low and the sector is experiencing a number of fundamental systemic problems, which contribute to the low level of performance of the sector. Poor management of funds and human resources, limited coverage and inadequate number of workers are some of the key sectoral problems. Recent estimates from the 2003 National Demographic and Health survey put under-five mortality rate as 217 per 1,000 with large regional variations. With regard to geo-political zones, the highest under-five mortality rates were found in the North West and North – East and the lowest in the South – East and South West. Here, the obstacles include poverty, poor access to health care facilities, HIV / AlDS, and poor maternal health. As regard to the improvement of maternal health, the challenges include teenage pregnancy, harmful cultural factors, lack of health personnel and other infrastructure (Particularly in rural areas)

It is estimated that 3.2 million to 3.8 million Nigerian adults and children were living with HIV / AlDS by end 2003. The age group most affected by the virus includes 20 -29 year olds while the regions with the highest median prevalence rates include the North Central, North East and South, South zones. Factors contributing to the rapid spread of HIV / AlDS in Nigeria, include sexual networking practices such as polygamy; high prevalence of untreated sexually transmitted infections (STIs), low condom use, poverty, low literacy, poor health status, low status of women, stigmatization, and denial of HIV infection risk among vulnerable groups.

Data on prevalence and deaths associated with tuberculosis reveal that while the prevalence rate appeared to be slowing down between 1990 and 1995, it began to rise again in 1996 by 1998, it was estimated that 27,840 people had the disease the prevalence of malaria remains high and this may be due to the abundance of unkempt drainage and an environment that aids the rectors of malaria. Data available indicates that the prevalence of malaria increased from 1,116,982 in 1990 to 1,875,380 in 1998. Death recorded from malaria, have also be on the increase.

Despite the strong argument in favour of a National Health Insurance scheme (NHIS) in a country where too many people can hardly afford good medical care, the

scheme could not come into being until the year, 2005. In launching the scheme, the president of Nigeria set aside N6 billion in the 2005 budget. The huge amount was expected to power the scheme in its fist year when no deductions will be made from worker's income. The scheme was framed in a way that every employer with a minimum of 10 members of staff shall be required to contribute to the scheme. Its aim is to provide affordable and qualitative health care to Nigerians especially those who may not have really money to pay hospital bills. In other words, the scheme will depend on the pooling of resources for the benefit of those who may fall ill. However, the various professionals in the health care sector are expected to close ranks and work for the success of the scheme.

3.0 HIV / AIDS

Health professionals in the United States of America, observed as increasing demand for immune system boosting medicines among homosexual who coincidentally were also suffering from an unusual outburst of pneumocystis carinii pneumonia (PCP) and consequently west into research to know why. Thus, in 1981, AIDS (ACQUIRED IMMUNE DEFFICIENCY SYNDROME) was first identified as a disease complex in homosexuals in the U.S.A. The cause of AIDS which is HIV (Human immune deficiency virus) was discovered in 1983 by the French scientists at the Pasteur institute in Paris. At about the same time, American scientists confirmed the link between HIV and AlDS. However, further research with retrospective studies of blood samples from Central Africa showed that AlDS was in existence as far back as 1975. Much later, a team of British researchers, working on preserved tissue samples of a Manchester sailor (who died in 1959) discovered that the stored samples had HIV in them, thus, suggesting that HIV/ AlDS must have been around as far back as 1959. However, the world Health organization (WHO) maintains that HIV is a virus of undetermined geographic origin.

AlDS is the end stage of HIV infection. HIV destroys the immune system, and when the immune system becomes unable to protect the body against common, otherwise unthreatening diseases, AlDS may be diagnosed HIV infection is caused by two strains of the human immune deficiency virus, HIV – 1 and HIV-2. Within HIV-1 are at least nine slightly different subtypes, each predominating in different parts of the world, although

researchers have found increased dispersion in recent years. HIV-2, which is less infectious and progresses more slowly, is found primarily in West Africa and some other regions of the world (World Bank, 1999).

Once introduced into the human body, HIV attacks mainly a subset of immune system cells, which bear a molecule called CD4. Specifically, the virus binds to two types of CD4 – bearing cells: CD4 + T-cells and macrophages. These cells perform various tasks critical to the normal functioning of the immune system. Macrophages engulf foreign invaders and prime the immune system to recognize these invaders in the future, and CD4+ T – cells organize the overall immune response by secreting chemicals to help other immune cells work property. The mechanism by which HIV actually kills CD4 + T-cells is not well understood at present.

Like other viral infections, HIV infection can be characterized as a battle between the immune system and the invading virus. However, HIV is a relatively even match for the human immune system, resulting in a long struggle, during which HIV advances slowly but inexorably. HIV finally "wins" the battle when the infected person develops serious opportunistic illnesses: AIDS

HIV is difficult to transmit except by sex or other direct contact with the bodily fluids of an infected person. The major modes of transmission are sexual intercourse, reuse of contaminated syringes by injecting drug users, infection via birth or nursing from mother to child, reuse of needles in medical settings and transfusions of contaminated blood or blood products. The most obvious impact of AlDS is on life expectancy and health. Measuring and predicting these impacts are difficult, not only because of the lack of quality data, but also because the relative size of the impact depends on many factors besides the spread of AlDS, including the success in fighting other health problems. Thus, AlDS threatens to reverse a century of progress in the fight against infections diseases and it is also likely to account for an increased share of the infectious disease burden.

With Africa bearing 70 percent of HIV infections, there is no gainsaying that the epidemic is one of the new key factors responsible for the continued under development of the continent (UNDP, 2004) Thus, the strong concerns over the HIV and AlDS epidemic

in Africa led to the gathering at a special summit in Abuja of the Heads of states and government of the organization of African Unity (DAU) in April 2001, to address the "exceptional challenges of the diseases. The product of this summit was the Abuja declaration in which the leaders committed themselves to all relevant decisions, declarations and resolutions on health, Development and the HIV and AlDS, particularly the "lome Declaration on HIV and AlDS in Africa" (July 2000) and the "Decision on the Adoption of the International partnership against HIV and AlDs" (Algiers, 1999).

The New partnership for Africa's Development (NEPAD) is a vision and strategic framework for Africa's renewal" it was initiated following a mandate gives to leaders of five African Nations by the OAU (AU) to develop as integrated strategic framework for the socio – economic development of Africa. This was formally adopted by the 37th OAU summit in July 2001 and endorsed by leaders of the G8 countries. NEPAD has adopted the MDGS as the focus of its agenda for development with a stated objective of achieving the overall seven percent annual growth required to halve poverty by 2015. HIV and AlDS is unquestionably a formidable challenge to sustainable human development in Africa and has been recognized as a cross – cutting issue which can jeopardize NEPAD'S OVERALL goals. For NEPAD to provide an effective framework for Africa's development, it must integrate HIV and AlDS into all its policies and programmes. The resolve of the partnership to pay urgent attention to HIV and AlDS will hopefully spur member States, including Nigeria, to increased and sustained action.

Before Nigeria recorded its first case of AlDS in 1986, it was loud in its denial of the infection of the country. One of the significant events that brought the message home to Mary Nigerians skeptics was the announcement on 2nd August 1997 that FELA Anikulapo – Kuti, had died of AlDS. However, the results of the periodic national HIV / syphilis sero – prevalence surveillance show that HIV prevalence in Nigeria has increased progressively among the general population, using ante – natal clinic attendees*** as proxy, from 1.8 percent in 1991 to 5.4 percent in 1999. High – risk groups in Nigeria, with higher prevalence of HIV than the general population, include commercials sex workers (CSWS), people infected with sexually transmitted infections (STIs), and long distance directs***. Compared to the prevalence of 4.5 percent among antenatal care attendees in 1995 / 96, the prevalence rate was 15.1 percent for STDs patients and 34.2 percent in

CSWs (United Nations, 2001). The implications of the current rate of HIV prevalence are grave. With the 1999 prevalence of over five percent, Nigeria has entered into a critical phase of HIV epidemics as the possibility of sexual contact with an infected person is increased significantly at that level. Data on the age, sex and geographical distribution further highlight the crucial challenges of HIV in Nigeria.

The age specific distribution of HIV in Nigeria clearly shows that the young people are the highest risk of the epidemic. In 1999, the country recorded a national prevalence of 8.1 percent, among people of age 20 to 24 years and 6.9 percent among those of 25 to 29 years. Next to these was the 15 to 19 years age group with a rate of 4.9 percent. The HIV prevalence rate among young Nigerian girls (15 – 24) may be more than double that of their male counterparts. UNAIDS (2000) identified that the HIV prevalence rate among Nigerian girls (ending 1999) was in the range of 4.35 to 5.89. Detailed result of the 1999 survey also showed that urban and rural areas are affected, and in fact, urban preponderance was only clearly demonstrated in 13 out of 36 states Also, HIV prevalence rate differs significantly between various States of the federation, even within the same geographical zone. On regional basis, the North – West and South – West regions have the lowest rates of 3.2 percent and 3.5 percent respectively while the North – central zone with a rate of 7.0 was the highest (FMOH, 1999)

In Nigeria, approximately 87 percent of the HIV infection in 1999 was identified to be due to HIV I, while 7 percent is due to HIV 2 and 6 percent is due to double infection with both HIV I and HIV 2. Among the HIV I strains, subtypes A (43 percent) and G (57 percent) are the predominant ones in Nigeria. Again, what is the proportion of HIV infections in Nigeria that is attributable to each of the well-known transmission modes for the infection: sexual transmission, mother – to – child transmission (MTCT), and transfusion through blood and blood products. Sexual route is believed to be responsible for over 80 percent of HIV transmission, with heterosexual transmission accounting for most of these. The risk of infected mothers in Nigeria passing on HIV to their children may be in the range of 25 – 35 percent, with the possibility of such transmission existing during pregnancy, at the time of delivery, and / or through breast feeding.

Underlying factors associated with transmission of HIV through contaminated blood include lack of centralized blood transfusion system, lack of enforcement of regulations guiding blood transfusion, poor quality control and assurance mechanisms in health care settings, inadequate attention to sterilization and infection control procedures. Others include indiscriminate blood transfusion practices, the dominance of commercial donors among blood donors, and high level of occurrence of blood – demanding health conditions such as road traffic accidents, pregnancy – related haemorrhage, armed robbery and violent events makes the possibility of HIV transmission through contaminated blood and blood products high in Nigeria. However, the underlying factors constitution the leading driving forces for the spread of the HIV infection include low level of education and high level of ignorance; cultural practices such as polygamy and wife – hospitality, high level and crippling effect of poverty, and lack of access to approximate reproductive health services and information particularly for young people. The practice of traditional surgery such as uvulectomy and blood – letting procedures with unsterilised instruments, sexual relations with traditional healers and non – observance of infection control procedures by traditional birth attendants who are still heavily patronized in Nigeria may also result in HIV transmission.

In Nigeria, the level of awareness of HIV / AlDS has steadily but slowly increased among the general population. The knowledge varies widely between the zones, with the lowest level recorded in the North West where less than 50 percent of women are aware of the disease. Whereas some cultural values are highly desirable and beneficial to AlDS prevention and control, some are detrimental and further compound the situation. Traditional practices that exist in certain communities such as wife inheritance and offering the wife to a visitor as part of hospitality have grave implications for increased HIV transmission. Culturally – based gender discrimination that promotes female subjugation and low status of women reduce the negotiation and assertiveness skills of women with regards to sexual activities and adoption of safer** sex practices. Again, stigmatization and neglect of HIV victims discourage open disclosure about one's disease status. Thus, affected people, particularly at the early phases of their infection hide their identities and may still be engaging in sexual practices with others. Poverty has the potential of increasing the risk of HIV as economically disadvantaged people may engage

in commercial sex work for survival. Poor people also have less access to education, thereby being rendered more ignorant about diseases.

Indeed in 1986 the establishment of a National Expert Advisory Committee on AlDS (NEACA) with the mandate to ascertain the magnitude of the HIV challenge and advise government on the necessary interventions required (following the report of the first two AlDS cases) marked the beginning of formal government response to HIV / AlDS. In 1987, the technical service agreement (TSA) was signed with WHO under the global programme on AlDS now (UNAIDS). In 1988, National AlDS control program NACP set up as national coordination / implementation unit within the FMOH, and replaced NEACA. Also, National AlDS committee (NAC) and five technical Advisory Committees (TACs) established as advisory bodies to the NACP. Equally, Stated AlDS control programs (SACPs) and the States AlDS committees established in all States of the Federation and federal capital Territory Abuja. In 1988 / 89, there was implementation of the short Term plan, which focused mainly on Blood safety and General Awareness. From 1990 to 1992, medium Term plan I, focused on decentralization of implementation of control efforts to (6As) AlDS integrated into PHC system; merging of AlDS control programme with STDs control programme to create the National AlDS and STD control programme (NASCP); Military President Launched National war Against AlDS, CSo's involvement in control programme commenced; 1st HIV sestinel surrey conducted, and Nigeria initiated on OAU agenda on AlDS.

From 1993 to 1998, medium Term plan II, focused on multi – sect or involvement and increased awareness; inadequate funding of response and withdrawal of international Donor support due to sanctions on Nigeria; increased Donor's support for CSOs' activities and resultant increased prominence and outputs of CSOs; and HIV related death of Fela Anikulupo Kuti, brought the reality of HIV/ AlDS rearer home to many Nigerians. In 1998 / 1999, there was bridging plan, which focused on expanded National Response to AlDS; comprehensive data gathering and analysis; intensive advocacy and intensive generals and targeted education. The New democratic government identified HIV / AlDS control as one of the priorities in national development and the president showed indication to personally be involved in the control effort. And consequently, in year 2000, presidential committee on AlDS (PCA) and National Action committee on AlDS (NACA)

established to improve response and ensure multi-sector and multi-level participation. Here, increased collaboration among development partners and three-year interim Action plans developed.

PAC is the highest decision – making body on AlDS in Nigeria and is personality headed by the president, with the vice president as the deputy chair. The NACA has the responsibility for coordination the entire national response to HIV / AlDS through the relevant agencies and partners, and is headed by SPECIAL ASSISTANT TO THE PRESIDENT (ON HIV / AIDS). To ensure effective coordination of the multi-sectoral, multi-level response at all levels; efforts were made to establish equivalents of NACA at state and LGA levels. Essentially, the cardinal objectives of the national response to HIV / AlDS / STD were as follows: prevention of further transmission and spread of HIV / AlDS / STD in Nigeria; reduction of impact and burden of the HIV / AIDS /STDs epidemic on people living with and affected by HIV / AlDS and the general society; and co-ordination and mobilization of national and international resources for effective HIV / AlDS / STDS response.

An Interim Action plan (IAP) was developed by NACA, in collaboration with other agencies to cover the 2000 – 2002 period, while the ground work for the formulation of a National strategic plan is being laid. The Lap is a comprehensive, multi – sector and multi – level plan focusing*** on priority issues in HIV / AlDS control in Nigeria. The overall focus of the IAP is the prevention of further transmission of HIV infection; the provision of care and support and the removal of barriers to large-scale response to HIV / AlDS. Strategic approach in the implementation of the lAP includes the promotion of behavioural changes, the generation and effective utilization of technical information and the efforts are ensuring sustainable financial resources for the campaign against HIV / AlDS. A review of the policy environment for HIV and AlDS programs in Nigeria reveals a weak legal and regulatory environment and poor coordination especially between the national government, local government, NGOs, private sector and international Donors.

More recently, though many Nigerian have heard about HIV and AlDS, only a few know how to prevent or cure the infection. In 2005, it was estimated that only 42% of the women and 60% of the men had knowledge of HIV prevention. The age bracket with the least knowledge of HIV and AlDS was the 15.19 year olds. Again, the 2003 National HIV and AlDS sentinel survey emphasizes the issue of expansion of care and support activities including the scaling up of the anti – retroviral program to meet the increasing demand. In

Nigeria, only 14,000 people are receiving ARV'S out of an estimated 1.5 million people who need the drugs. This indicates coverage of only 1%. HWO and UNAIDS three by five initiative which aims to provide anti – retroviral therapy to three million people with HIV and AlDS in developing countries, is a good development. Thus, the list of sites for the National ARV treatment program in Nigeria are as follows: Nigerian institute of medical Research (YABA – LAGOS), Creek military hospital (IKOYI – LAGOS), Lagos University Teaching hospital (IDI – ARABA – LAGOS), National Institute for pharmaceutical research and development (ABUJA), NATIONAL HOSPITAL (ABUJA), Directorate of State Service Clinic (ABUJA), National Intelligence Agency Clinic (ABUJA), GWAGWALADA SPECIALIST HOSPITAL (ABUJA), STATE HOUSE CLINIC (ABUJA), CENTRAL BANK CLINIC (ABUJA) JOS UNIVERSITY TEACHING HOSPITAL PLATEAU; UNIVERSITY COLLEGE HOSPITAL (IBADAN), AHMADU BELLOW UNIVERSITY TEACHING HOSPITAL (ZARIA), UNIVERSITY OF MAIDUGURI TEACHING HOSPITAL (BORNO), NNAMDI AZIKIWE TEACHING HOSPITAL (NNEWI), UNIVERSITY OF NIGERIA TEACHING HOSPITAL (ENUGU), UNIVERSITY OF BENIN TEACHING HOSPITAL (BENIN), UNIVERSITY OF ILORIN TEACHING HOSPITAL (ILORIN), UNIVERSITY OF PORTHARCOUR TREACHING HOSPITAL (PORT HARCOURT), USMAN DAN FODIO*** UNIVERSITY TEACHING HOSPITAL (SODOTO), AMINU KANO TEACHING HOSPITAL (KANO), FEDERAL MEDICAL CENTER (U***) , FEDERAL MEDICAL CENTER (GOMBE); FEDERAL MEDICAL CENTER (MARKURDI) FEDERAL MEDICAL CENTER (OWERRI).

Indeed, scientists are getting closer to resolving the HIV / AlDS mystery. Researchers recently announced that they have successfully unraveled the structure of an anti – body that neutralized the human immunodeficiency syndrome, AlDS disease. For any patient to survive high risk associated with HIV / AlDS, the patient must spend a fortune because anti – retroviral drugs (ARV) are scarce and costly and only act as suppressant and not the (cure). Nucleoside reverse transcriptase inhibitors such as A2T. These show down production of the reverse transcriptase enzymes the HIV needs to turn RNA in DNA. These essential AlDS drugs

Are listed in the table below.

NAME	PRICE	MAKER	DOSAGE
ABACAVIR ZIAGEN	E631.45 $985.50	GSK	300mg twice a day
GAVUDINE (64T) ZERIT	E33.37 $54.75	BRISTOL MYERS	40Mg twice a Day
ZIDOVUDINE (AZT OR DZV) RETROVIR	E281.05 $438	GSK AND CIPLA	300 – 600mg Per day
DIDANOSINE (OOL) VIDEX	E189.09 $310.25	BAISTOLMYERS SQUIBB	25,50,100,150MG dozes
LAMIVUDINE (3TC)	E149.65 $237.25	GSK	150MG Twice daily
INDIANAVIR CRIXIVAN	E366.03 $600.00	MERCK ***CO	800mg every 8 hours
SAQUINAR INVIRASE	E1079.00 $1726.40	HOFFMAN– LA ROCHE	8-200mg capsules twice a day
RITONAVIR NORVIR	E304.77 %500.00	ABBOTT LABORATORIES	600mg twice a day – To be used in combination with indnarir, lopinant and squinavir.

NAME	PRICE	MAKER	DOSAGE
NELFINAVR VIRACEPT	E496.08 $801.00	ROCHE	3-250mg, 3 times a day.
LOPINAVIR TRITONAVIR Kaletra	E304.77 $500.00 Abbott Laboratories	Abbott Laboratories	Threspills a day with food
EFAVIRENZ Stocrin	E216.71 $346.75	BRBTOL Myers Squibbin	600MG Once a day
NEVIRAPINE (VIRAMUNE)	E271.35 $438.00	BOEHRINGER INGELHEIM	200mg per day for two weeks, then

		ROXANNE LABORATORIES 9AIDSMEDS. GSM)	400mg per day. It is used for one-off treatment of mothers about to give birth to prevent transmission of HIV to the baby
DUOVIR N	E258.96 $304.00	CIPLA	ONE TABLET Twice a day.
TRIOMUNE	E188.34 $304.00	CIPLA	One tablet twice a day
COMBIVIR	E384.42 $620.50	GSK	One tablet twice a day
TRIZIVIR	E974.76 $1602.00	GSK	One tablet twice a day

MALARIA / SARS

Malaria is one of the greatest killer diseases in Africa. The world health organization report shows that the diseases killed over seven million African within a period of five years. The diseases has also been said to be responsible for 25 percent of anemia (blood shortage) and about 15 percent of low birth weight in Nigeria alone. Human malaria is an infection diseases caused by microscopic parasites and transmitted by mosquito (Anopheles mosquito) bites. It is mainly of diseases common in hot and wet climate, which can also be transmitted through transfusion of infected blood, through inculation and through infected mother to her child.

In the last five years, the resistance of malaria and signs (symptoms) have brought about renewed concerns about the danger posed by this diseases. A lot of people don't even know that they carry very high malaria parasite through because they do not show signs of high fever, feverish condition, as was the case of sufferers in the past. In this period, malaria attack was characterized by fever, rigour, and ailments only to be diagnosed of malaria parasite present in their system. Also, malaria attack was characterized by fever, rigour, and malaria, vomiting, nausea and headache. The skin of the sufferer appeared pale, the body temperature rose and this became hot and dry and as then temperature fell excessive sweating occurred and the pulse rate rose.

More recently, sufferers may not feel all these. They may experience slight fever occasionally, coupled with rigour and dizziness as well as by constant joint pain. And yet, malaria destroys internal body organs. These include kidney, liver or heart problems. However, the greatest problem facing the prevention and eradication of malaria in Africa is the resistance of the diseases to treatment. In virtually all the zones of this country the resistance to drug has been noticed ranging from 15 percent resistance in the South – West to as high as 63.5 percent resistance in the South – East. Similarly there is the serious adverse effect of most of these drugs. It has been confirmed that chloroquine and artemether could have adverse effect on sperm motility and its power to fertilize a woman's eggs. Motility is the ability of the sperm to swim to meet the ovary (eggs) for fertilization. This is the reason why most of our men are infertile today chloroquine in – take could significantly reduce motility by 40 percent. The higher the dosage of the drugs the more severe its effect on sperm motility. However, some medicinal herbs good for the treatment of malaria. They include CINCHONA, A zardirachita Indca (dongoyaro); Yoruba Omwo, Yoruba maigora; acida (Yoruba – Orombo Wewe); Carica papaya (palpaw-Ibepe); Awopa, the leaves and bark Lali.

In order to prevent malaria, avoid going out between dusk and dawn when Anopheles' mosquitoes commonly bite people and make sure your rooms or homes are generally kept clean and use effective in –secticide. Wear long slave shirts and trousers (men) or long gowns with long sleeves when going act at night and avoid wearing dark cloths that attract mosquitoes. The use of treated nets are also advisable.

Try to keep the environment clean by clearing the bush and cleaning your toilets and gutter always. Drain natural ponds, pools and large puddles since they are ideal breeding grounds for Anopheles mosquitoes. Though malaria has killed millions of people in Nigeria, it is still curable and preventable. In, February 2005.

The world heart about the severe Acute Respiratory syndrome (SARS) and by then, it was only reported in China and its administrative region, Hong Kong. Much later, health authorities in 26 countries had acknowledged the invasion by SARS of their territories. As at 24/04/2005, a total of 439 infections had been reported and 263 deaths recorded. Nations have since been gripped by panic while the WHO is treating the ailment as "the mother of all epidemics". Apart from a travel advisory issued by the Federal Government of Nigeria, nothing has been done or said about the virus in Nigeria. This is

in spite of the fact that many Nigerians have been traveling to and from several countries on the infection list.

SARS illness usually begins with a fever (measured temperature greater than ($38.0^{o}C$). The fever is sometimes associated with chills or other symptoms, including headache, general feeling of discomfort and body aches. After two to seven days, SARS patients may develop a dry, nonproductive cough that might be accompanied by or progress to the point where insufficient oxygen is getting to the blood. In 10 percent to 20 percent of cases, patients will require mechanical ventilation.

At present, the most efficacious treatment regimen, if any, is unknown. In several locations, therapy has included antiviral such as oseltamirir or Ribavirin. Steroids also have been gives orally or intravenously to patients in combination with Ribavirin and other antimicrobials. In the absence of controlled clinical trials, the efficacy of these regimes remains unknown. Early information from laboratory experiments suggests that Ribavivin does not inhibit virus growth or cell – to – cell spread of one isolate of the new corona virus that was tested.

However, the primary was that SARS appears to spread is by chose person -to – person contact. Must cases of SARS have involved people who cared for or lived with someone with SARS or had direct contact with infections material (such as respiratory secretions) from a person who has SARS. Potential ways in which SARS can be spread include touching the skin of other people or objects that are contaminated with infections droplets and the touching your eye(s), nose, or mouth this can happen when someone who is sick with SARS coughs or sneezes droplets onto themselves, other people, or nearby surfaces. It is also possible that SARS can be spread more broadly through the Air or by other ways that are currently not known. Again, people are most likely to be infections when they have symptoms, such as fever or cough. However, it is not known how long before or after their symptoms begin that patients with SARS might be able to transmit the disease to others.

Recently, scientists have detected a previously unrecognized corona virus in patients with SARS. This new corona virus is the leading hypothesis for the cause of SARS; other viruses are still under investigation as potential causes. Corona viruses are a group of virus that have a halo or crown – like (corona) appearance when viewed under a microscope. These viruses are a common cause of mild to moderate upper- respiratory illness in humans and are associated with respiratory, gastro intestinal, liver and

neurologic disease in animals. Scientists isolated a virus from the tissues of two SARS patients and then used several laboratory methods to characterize it Examination by electron microscopy revealed that the virus has the distinctive shape and appearance of corona viruses, and genetic analysis suggests that this new virus does belong to the family of corona viruses but differs from previously identified family members. Tests of serum specimens from people with SARS showed that they appeared to have been recently infected with this virus. Other tests demonstrated that this previously unrecognized corona virus was present in a variety of clinical specimens (including specimens obtained by nose and throat swab**) from other SARS patients with direct or indirect links to the outbreak. These results and other findings reported from laboratories participating in the WHO network provide growing evidence in support of the hypothesis that this new corona virus is the cause of SARS. While they cannot predict when they will find a treatment, they should know soon if an effective medicine is likely to be in hospitals quickly. If more in testing shows promise in the next few years, a treatment may have to be created from scratch, a process that could take a decade for now, SARS treatment amounts to keeping patients isolated and dealing with their symptoms while the infection runs its curse.

5.0 MATERNAL HEALTH / CHILD MORTALITY

According to the United Nations MDG'S, the target for any nation, is to reduce by two – thirds between 1990 and 2015 the order – five-mortality rate and reduce by three quarters, between 1990 and 2015, the material mortality ratio. However, nearly 11 million children order the age of five die in the world every year or well over 1,200 every hour, most from easily preventable or treatable causes. Again, 500,000 women die in pregnancy or childbirth each year, or one every minute. Over her lifetime, a woman in sub-Saharan Africa faces a 1-in-16 chance of dying in childbirth compared with 1-in-160 in other regions of the world.

In Nigeria, the available data shows that while the maternal mortality rate in the early 1990s was between 1400 to 1500, it dropped to 1000 per 100,000 live births in the late 1990s to 2001. in 1999, although the national maternal mortality rate was 704 per 100,000 live births, there was considerable regional variation. While the South West and South East recorded 165 per 100,000 and 286 per 100,000 the rates were much higher in

the North West and North East, which had 1,025 per 100,000 and 1,549 per 100,000 respectively. The proportion of births attended by skilled medical personnel dropped from 45 percent in the early 1000s to 31 percent in 1998 but rose again to 42 percent in 2000. For about 47 percent of all births recorded in the five years preceding 2003, the mothers made at least four critenata case visits, whereas in the five years before 1990, 52 percent of the mothers made at least four critenatal case visits 9NDHS, 2003). Again, only about 63 percent of the mothers received antenatal care from medically qualified personnel with 2.5 percent being attended to be traditional Birth Attendants (TBA) during the five years before 2003.

Cultural and attitudinal factors are important in addressing maternal health. In some parts of the country, husbands still insist that only female health personnel should attend to their wives. Taboos also challenge maternal health, including various beliefs that impinge on the health of the woman. There is an absence of trained medical personnel including nurses outside major cities. Thus, a large number of women make use of the traditional birth attendants (TBAS), especially in the rural areas. Some of these (TBA) may be involves in harmful traditional practices, such as female genital cutting, thus the integration of traditional birth attendants and health practitioners into modern health care is a necessity. Again, healths facilities in rural areas are not open for long hours and do not provide the minimum package of essential services. They lack sufficient qualified health personnel, equipment and other infrastructure and thus the number of women making use of these antenatal health care facilities is very low.

The under – five mortality rate increased from 147 per 1,000 in 1990 to 176 per 1,000 in 1995 before falling to an all time low of 119 in 1998. Thereafter, it increased steadily overtime. All available indications are that it is very unlikely that Nigeria would meet the 2015 target of reducing under – fire mortality by two – thirds Regarding infant mortality, the dated shows that the infant mortality rate was 85 per 1,000 live births in 1990 and it increased to 195 per 1,000 live births in 1994. The rate eventually dropped to 114 between 1995 and 1993 and 75.1 per 1,000 by 2002. However, recent data from the NDHS (2003) indicates that rural areas experienced higher infant and under – five mortality rates than urban areas over the 10-year period preceding the surrey. Urban areas had under-five and infant mortality rates of 153 per 1,000 and 81 per 1,000 respectively compared 243 per 1,000 and 121 per 1,000 for rural areas. This difference is attributed to differences in neonatal rates, the probability of dying within the first month of life, which

is higher in rural areas. This is due to unequal access to health facilities since urban residents are expected to have better access than rural residents.

Concerning the geo- political zones, the highest under-five mortality rates were found in the North West and North East, while the South East and South West had the lowest rates. These results are due to the fact that poor people are unlikely to be able to afford treatment and medicines in good hospitals, especially when it involves referral cases requiring movement from one particular location to the other. This problem is more pronounced in the rural areas where there is less access to good health care services and the population is predominantly poor. Furthermore, there is lack of adequate provision of health care services in many parts of the country, especially the rural areas. Using the number of doctors and hospital beds per 1,000 people as indicators of the adequacy of the available health services, the data shows that on the average, there was much less than one bed to 1,000 people. This is indeed a major challenge to reducing under – five mortality in Nigeria

6.0 **PUBLIC HEALTH/CLINICAL SERVICES / DNACHALLENGES**

Public health programs strike against health problems of entire populations or population subgroups. Their objective is to prevent disease or injury and to provide information on self-cure and on the importance of seeking care. On the other hand, clinical services respond to demand from individuals. They generally seek to cure or to ease the pain of those already sick. Essentially, public health programs deliver specific health services to populations (such as immunizations); promote healthy behaviour and healthy environments.

Population – based health services such as the expanded program on immunization (EPI) rely on personnel with limited training to provide drugs, vallines or specific health services directly to specific populations (in schools, at worksites or in house holds). Government finance for such programs is justified because the objective is usually to provide services to all in a community, because the services create externalities or indirect benefits, and because the diseases they typically combat are particularly problems for the poor. Three types of interventions are immunization, mass treatment for worms and other infections, and screening and referral. Information, education and communication are critical to many such programs.

Over the past two decades, vaccines to prevent tuberculosis, measles, diphtheria, pertussis, tetanus, and polio have revolutionized preventive medicine. These vaccines, together with BCG immunization against tuberculosis and leprosy and immunization of pregnant women against tetanus, form the EPI. Two extensions to the EPI appear to be justified. Coverage should be extended to a greater percentage of all children born. It also makes sense to include additional items in the package: hepatitis B and yellow fever vaccines for selected countries and vitamin A and iodine supplements in regions where deficiency of these micro nutrients is highly prevalent. Adding these two vaccines and two vaccines and two micronutrients to the EPI would improve health substantially, particularly in the poorest households, for a modest increase in the cost of reaching each child with complete services (vaccines and micronutrients).

The most common intestinal worms (round worms, hookworms, and whipworms each infect school – age children annually. Schistosomiasis infection, also caused by parasitic worms, affects school children annually. The immediate effect of infection – including failure to thrive, anemia, and impaired cognition can now be rapidly reversed by low – cost, single-dose oral therapy. Curing worm infections is simple with inexpensive modern drugs such as albendaizole and praziquantel because it is no necessary to determine which species are present. Treatment usually cures the current infection, but in endemic areas children will inevitably become reinfected. Rates of reinfection can be reduced by environmental improvements, especially sanitation, but where this is impractical or unaffordable, it is cost-effective to repeat the therapy regular interrals.

Mass screening for disease control involves the examination of a symptomatic individuals to identity and treat those affected by disease. This method has been used to control some infections diseases such as tuberculosis as well as no communicable diseases. Mass screening makes sense for highly prevalent diseases that can be cured by early treatment, especially when latency periods span many years. Screening with papanicoluou (Pap) smears is common in industrial countries, but attempts to replicate those efforts in developing countries have rarely been successful. Again, eating well is necessary for good health. Either directly or in association with infections diseases, inadequate diets account for a large share of the world's diseases burden much of this suffering stems from poverty – related under consumption of protein and energy, but equally important are deficiencies of key micronutrients (iodine, vitamin A and iron).

Increasing the incomes of the poor is the most effective means of reducing protein energy malnutrition, but government can play as effective direct role through nutrition education.

Low height for a given age, or stunting is the most prevalent symptom of protein – energy malnutrition and thus raises the risk of death and may reduce physical and mental capacity. Iron deficiency is the most common micronutrient disorder. It reduces physical productivity and children's capacity to learn in school. By reducing appetite, it may diminish children's intake and growth. Women suffer especially because menstruation and child bearing raise their need for iron, and anemia, a shortage of iron in the blood, increases the risk of death from hemorrhage in childbirth. Again Iodine deficiency causes mental retardation, delayed motor development and stunting, as well as neuromuscular, speech, and leaning disorders. It is the leading preventable cause of intellectual impairment in the world. Vitamin A deficiency causes varying degrees of vision loss and is the primary cause of acquired blindness in children. It also increases the severity of and mortality from a variety of infections, especially measles and diarrhea. However, family planning services, particularly when delivered through community – based distribution, are among the most cost – effective means of improving maternal and child health.

Decision about the use of tobacco, alcohol, and other drugs are among the most important health – related choices that individuals can make. In many populations, prolonged cigarette smoking is already the greatest single cause of premature death. Poor households generally live in a domestic environment with high health risks caused by poor sanitation and inadequate water supply, inadequate garbage disposal and drainage, heavy in door air pollution and crowding. The diseases associated with poor household environments occur mainly in developing countries, where they amount for nearly 30 per cost of the total burden of disease. Modest improvements in household environments would arrest almost a quarter of this burden, mostly as a result of reductions in diarrhea and respiratory in infections. Furthermore, radiation and pollution of air and water are additional health hazards. Many cities suffer from air pollution caused by industry, power plants, road transport, and domestic use of coal. Air pollution damages the human respiratory and cardio respiratory systems in various ways. Lead poisons many systems in the body and is **particularly dangerous to children's development brains and nervous systems.** Airborne lead concentrations are high in polluted urban environments, where lead comes mainly from the exhaust of vehicles burning leaded gasoline.

Elevated lead levels in children have been associated with impaired neuropsychological development as measured by loss of Intelligent Quaint (I Q) poor school performance and behavioral difficulties (1993)

Depletion of the atmospheric ozone layer and global warning pose potential threats of unknown magnitude to health. International agreements are limiting or will limit the release of chlorine compounds that can harm the ozone layer and of the greenhouse gases that contribute to global warming. Again, motor vehicle crashes are responsible for as increasing burden of injury and death in developing countries each year throughout the world road traffic injuries causes a loss and significant percentage of the global burden of disease. Men suffer roughly twice the burden from road traffic injuries as women. The young and the old are particularly vulnerable, as are drivers of nonmotorized vehicles and pedestrians unfortunately, the road fatalities and injuries in Africa is rising rapidly with urbanization and growth in the volume of traffic.

In general, clinical services are finance through fair main channels. The private channels include out – of – pocket payments and voluntary insurance. The public channels include the compulsory insurance that is either publicly managed or heavily regulated by governments, and funding from general government revenues. There, the three ways of organizing clinical health services include public, private nonprofit and private for-profit. All national health system use at least two of the twelve possible combinations of financing method and health services organization, and sometimes the differentiated populations. A basic responsibility accepted by governments almost everywhere is to assure access to a package? Although political considerations will inevitable affect the decision, the most important factors in selecting the essential package should be the relative asst-effectiveness of interventions, the size and distribution of the health problems affecting the population and the resources available.

Policies related to the delivery of health service in developing countries should have two main objectives. The first is to improve access to essential clinical services, especially for the poor. The second is to increase the efficiency with which services are delivered. In the public sector, inefficiency is widespread. Clinics and outreach programs operate poorly because of shortages of drugs, transport and maintenance. Hospitals are

poorly organized and manage and keep patients longer than necessary. Countries pay too much for drugs of low efficacy, and drugs and supplies are stolen or go to waste in government warehouses and hospitals.

In the present past, scientist had identified DNA as the molecule that carried the biochemical information that enables all living things to exist. Francis crick and James Watson (1953) declared that they had just discovered the secret of life. That is, that the had worked out the molecular structure of DNA (the chemical substance found in the nucleus of every living cell). The double helix structure had deduced revealed that DNA could do two crucial things: carrying information and replicating itself. It was thus, a discovery that could revolutionize the health sector.

Essentially most living things are made up of huge number of tiny cells. Inside each cell is a nucleus and inside each nucleus are bundles of threads called chromosomes, which contain the genes. Each cell in a plant or animal contains a complete copy of all its genetic material. Human cells have 46 chromosomes: 23 pairs of chromosomes each containing one chromosome from the mother and one from the father. Genes consist of a complex chemical called deoxyribonucleic Acid (DNA) which was discovered in 1869 by friend rich miescher when he was studying white blood cells. However, in 1945, Oswald A very discovered that DNA was the carrier of heritable information. But the structure of the DNA molecule and how it carried its genetic information remained a mystery until crick and Watson **identified the famous double Helix** (resembling a long twisting ladder) which immediately suggested a copying system if is now known that DNA is composed of four chemical bases known as A, T, G and C cadenine, thymine, guanine and (cytosine). These four bases are arranged like steps on the ladder. A always links with T, G always links with C, and the precise sequences in which the pairs are arranged is the code that genes use to give instructions for the manufacture of the many proteins needed for the formation and functioning of the living organism throughout its life. The As, Ts, Gs and Ls function like an alphabet. On their own they are just a letter, but when combined into words and seitenes (genes) they develop meaning. Biological machinery in

the cell reads these sentences and crimes out their orders. When a cell divides, the straws of the ladder split apart and new bases are added to each straw, to make two copies of the original DNA molecule. In this way cells can multiply and grow. A typical human gene (a section of DNA) consists of several thousand based pairs. Sequencing projects, such as the human genome project, aim to establish the sequence of all the bases in human or other DNA and label the precise function of each gene.

The imminent announcement of the completion of the human genome project (**fifty years after Francis crick and James Watson historic break through)** marks both an end and a new beginning. It is indeed, the dawn of a new era in biological research, in which our growing understanding of the precise function and product of each of our 30,000-40,000genes will bring important new advances to medicine and other many other aspects of life on earth. Funding for the British side of the **HUMAN GENOME PROJECT (HGP)** came from the well come Trust, who agreed to establish a major genome-sequencing centre (the Sanger Institute, near Cambridge). It was here that one third of the three billion bases in the human genome has been sequenced, including chromosome 22, the first human chromosome sequence to be published. The DNA used came from 12 volunteers. As humans are only 99.9 percent identical, the final sequence is described as reference sequence rather than a perfect sequence. Infact, it is 0.1 percent that makes us individual rather than identical chones.

DNA sequencing is the process of determining the exact order of the bases (A,T,C and G) in a piece of DNA. As it is not possible to sequence a whole chromosome (50.280 million bases) at a time, the genome is broken down into smaller pieces of DNA. Each piece is sequenced and then computers fit all the sequences back together. Indeed, the human genome contains 3154.7 million chemical nucleotide bases (A,C,T and G). Only about 5% of the genome consists of gene sequences. The total number of genes is estimated at 30,000-40,000. The average gene consists of 3,000 bases but sizes vary, with the largest known gene containing 2.4 million bases.

The complete human genome sequence is mankind's first step towards understanding how genes work, their complex interactions with each other and with the environment and their role in health and disease. In the coming decades, scientists will use data from the human and other genome projects to develop new technologies that will lead to healthier people and animals and a less polluted environment Essentially, genomics is expected to bring better diagnostics; new targets for medicine; gene therapies to treat

disease; new vaccines human – identical therapeutic proteins from animal milk; improved grafts and cell repair systems; safer*** food; healthier farm animals and improved meat and daisy**** quality; crops that can adapt to hostile and changing environments; new way to collect and store solar energy; new and better industrial biotechnology processes.

7.0 METHODOLOGICAL FRAMEWORK

Essentially, the field of health economics is concerned with the study of the allocation of resources to the delivery of health services. In recent years there has developed a quantitative approach to this field, concentration on the econometric estimation of certain important relationships. Among the most important of these relationships are demand functions for health services and cost curves for hospitals. It is only natural that an economic study would treat demand and the demand for health services has been the subject of numerous studies.

Our study therefore, propose to determine the effects of variables included in a typical demand functions such as price and income. However, an additional objective is that of estimation the effects of variables specific to or particularly relevant to the demand for health, such as health insurance, health condition, age sex and so on. The modeling shall based on cross – section data on Nigeria families (North West, North Central, North East, South West, South East, South-South categories). The analysis shall be limited to those individuals with positive observed quantities of the health service considered and their estimated demand curves for hospital length of stay and physician visits. Here, the estimated demand equations for hospital length of stay and physician office visits are

Hospital length of = (price of hospital bed x coinsurance rate, stay (Days) price of office visit x physician coinsurance rate, wage income / week, Nonwage income, education 13-15 years, education 16+years, Age 35-54; Age 55-64, age 65 + family size, disability days; Health status good, Health status fair, health status poor, physicians per 100,000, Beds per 1000) signifies dummy variable, taking value I if characteristic is present and 0 if it is not. A related model is specified 95

Physician office visits (Number) f (the same explanatory variables as above)

Again, cost curves for hospitals form the other main area of application of econometric techniques to health economics, in part because of the central role of the

hospital in the delivery of health services. Using data from sample) hospitals, our average – cost curve model is $AC = f(U, \sum F, D)$

Where AC is the average cost per patient day; U is the percentage occupancy rate; $\sum F$ is an unweighted index of facilities and services; D is an urban dummy variable (1 for location in a standard metropolitan statistical Area (SMSA); O otherwise). Another related cost model is in $(AC/\bar{AC}) = f(\text{In } /U/\bar{U}), \text{In } (S/\bar{S})\ t, f)$

Where AC / AC is the logarithm of the ratio of cost per patient day AC to the average of this cost per patient day for the individual hospital over the entire time period In $(U/\bar{U})$ is the logarithm of the ratio of the utilization rate U (the ratio of total bed – days to available bed – days) to its average for the hospital over the period; time t; and a dummy variable to account for possible errors in the semi-annual data f, taking the value 0 if the observation is for the first half of the year and 1 if it is for the second half.

Furthermore, we propose to develop a simultaneous equations model of the health – care system. The endogenus variables can be described best, in terms of the institutions and manpower explicitly included. The inpatient institutions to be in the model are

(a) Voluntary and proprietary short – term hospitals

(b) State and Local government hospitals

(c) Federal and non-federal short-term general hospitals

(d) Skilled Nursing homes

The endogenous variables for each patient days provided and number of beds. In addition, the model includes, as endogenous variables, the daily service charges for 0 and 1 *** and the occupancy rate for (a), (b) and (d). The out patient institutions treated in the model are

(e) outpatient clinics of short-term voluntary and proprietary hospitals

(f) Outpatient clinics of short-term state and local governmental hospitals (g) Outpatient clinics of federal and non-federal short-term general hospitals (h) Offices of medical specialists in private practice. (i) Offices of surgical specialists in private practice.

Here the endogenous variable for each is patient visits and the model also includes, as endogenous variables, the price per visit for e, h and I. The types of manpower to be treated in the model are

J Medical specialist physicians in private practice.

K Surgical specialist physicians in private practice.

L Other specialist in private practice.

M. Physicians employed by hospitals

N Hospital interns and residents

O Registered Nurses

Q Allied health professionals

R Non medical Labor

The endogenous variable for each is the number active or employed. In addition, the model includes as endogenous***** variables, the annual wage for P, Q and R. The exogenous and standardizing variables of the model include demographic variables / total population, proportion of the population age 65 and over) economic variables (per capita income, consumer price index), insurance variables (private health insurance, Medicare and Medicaid expenditures), and health manpower variables (stocks of registered nurses and practical nurses). The basic mechanism of the model is that of demand and supply, as applied to inpatient institutions to yield patient days and daily service charges, to outpatient institutions to determine patient visits and prices per visit, and to health manpower categories to determine numbers employed and wage rates. The model is not equilibrium one. However, it allows both for inequality of demand and supply and for lags in the process of adjustment to equilibrium.

8.0 EXPECTED RESULTS AND IMPACT

The estimated model can be used for various purposes, including forecasts of health services and health manpower and simulation of certain changes in the nation's health care system. Among the changes to be simulated using the model are a redistribution of physicians to "shortage" areas and a reduction in the rate of construction of new hospital beds.

The model results will also be able to reveal both primary and secondary consequences of such changes, such as the magnitude**** of increased of outpatient visits resulting from reduced bed construction – through this type of simulation, the estimated model and other estimated models of health care system can reveal the consequences of policy change. They can therefore provide an important vehicle for health care planers to use in evaluating policy alternatives. Finally the project will assist in the formulating a viable health police inform framework that will guarantee the attainment of the United Nations Millennium Development goals. (As well as the capacity to live longer, healthier and more productive lives).

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